

CLAIMS

1. A miniature fan or micro-fan
which comprises a fan housing (22; 68; 112; 150) through
which a substantially annular air duct (114; 152) extends in
the axial direction,
there being arranged in a central region of the air duct
(114; 152) a carrier hub (64; 118; 156) which carries the
internal stator (72; 122) of an electronically commutated
external-rotor motor (28, 30; 70; 158; 202) whose external
rotor (80; 160), equipped with at least one permanent magnet
(86), carries an impeller wheel (130; 162) that is arranged
rotatably in the air duct (114),
and comprising a circuit board configuration (32; 90, 94;
134; 163)
 - which comprises a motor region (34; 42) that is
arranged in the central region of the air duct between the
carrier hub (64; 118) and the internal stator (122), and
carries at least one galvanomagnetic rotor position sensor
(36; 44) that is controllable by the magnetic field of the
permanent magnet (86) provided on the external rotor,
 - which comprises a component region (50; 138) for the
reception of electronic components (96; 170) of the external-
rotor motor, which component region is arranged substantially
outside the air duct (114; 152); and
 - which comprises a bridge portion (40; 48; 136; 174) by
way of which the motor region (163) of the circuit board
configuration is electrically connected to the component
region (168).

2. The fan according to claim 1,
wherein the motor region, bridge portion, and component
region are implemented as parts of the same circuit board.

3. The fan according to claim 1 or 2,
wherein the circuit board is implemented at least locally

in flexible fashion.

4. The fan according to claim 3,
wherein the flexible region is deflected between the
motor region and component region.

5. The fan according to any of the preceding claims,
wherein the circuit board configuration comprises
flexible stranded conductors in the bridge region between the
motor region and component region.

6. The fan according to any of the preceding claims,
which is implemented as an axial fan.

7. The fan according to any of the preceding claims,
wherein the internal stator is implemented with claw
poles (74; 124) and an annular winding (76; 126; 164).

8. The fan according to claim 7,
wherein the annular winding (76; 126; 164) is
electrically connected to the motor region of the circuit
board configuration.

9. The fan according to any of the preceding claims,
wherein the component region (138; 168) is arranged
substantially in a closed-off region (98; 142; 172) of the fan
housing (22; 68).

10. The fan according to claim 9,
wherein the closed-off region is sealed, preferably in
liquid-tight fashion, by means of a cover (100; 172).

11. The fan according to claim 10,
wherein the component region (94) of the circuit board
configuration is mounted on the cover (100) by means of at
least one support member (102).

12. The fan according to any of the preceding claims, which is controllable via a data bus.

13. The fan according to any of the preceding claims, wherein a bridge portion (40, 48; 136) of the circuit board configuration (32; 90, 94; 134; 163) extends in the region of a strut, the latter connecting the external-rotor motor (28, 30) to the fan housing (22).

14. A miniature fan or micro-fan which comprises a fan housing (22; 68; 112; 150) through which a substantially annular air duct (114; 152) extends in the axial direction, that housing being connected via at least one carrier member to a carrier hub (64; 118; 156)

that is arranged in a central region of the air duct (114; 152) and carries the internal stator (72; 122), comprising an annular winding (76; 126; 164) and implemented as a claw-pole stator, of an electronically commutated external-rotor motor (28, 30; 70; 158) whose external rotor (80; 160), equipped with at least one permanent magnet (86), carries fan blades (130; 162) that are arranged in the air duct (114),

and comprising a circuit board configuration (32; 90, 94; 134; 163)

- which comprises a motor region (34; 42) that is arranged on the radially inner side of the air duct between the carrier hub (64; 118) and the claw-pole stator (122), is adapted for electrical connection to the annular winding (76; 126; 164) of the claw-pole stator, and carries at least one galvanomagnetic rotor position sensor (36; 44) that is controllable by the magnetic field of the at least one permanent magnet (86) provided on the external rotor,

- which comprises a component region (50; 138) for the reception of electronic components (96) of the external-rotor motor, which component region is arranged substantially outside the air duct; and

- which comprises a bridge portion (40; 48; 136; 174) by way of which the motor region (163) of the circuit board configuration is electrically connected to the component region (168).

15. The fan according to claim 14,
which is implemented as an axial fan.

16. The fan according to claim 14 or 15,
wherein the component region (138; 168) is arranged substantially in a closed-off region (98; 142; 172) of the fan housing (22; 68).

17. The fan according to claim 16,
wherein the closed-off region is sealed, preferably in liquid-tight fashion, by a cover (100; 172).

18. The fan according to claim 17,
wherein the component region (94) of the circuit board configuration is mounted on the cover (100) by means of at least one support member (102).

19. The fan according to any of claims 14 through 18,
which is controllable via a data bus.